GARDINIER INC.

Post Office Box 3269 • Tampa, Florida 33601 • Telephone 813 - 677 - 9111 • TWX 810 - 876 - 0648 • Telex - 52666 • Cable - Gardinphos

May 26, 1987

~~Clair~~ 6-2-87
Bill,
New permit
Acc. ~~Upgrade~~ Return to me
for filing Bruce

Mr. Clair H. Fancy
Air Quality Management
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399

Subject: Permit Renewal and Modification, No. 5 Diammonium Phosphate Plant, Permit No. AO29-56011

Dear Mr. Fancy:

Please find attached with the appropriate fee, four copies of an Air Construction Permit application for our existing No. 5 Diammonium Phosphate Plant. This application covers Gardinier's routine permit renewal together with a request for approval of certain modifications.

Gardinier requests modification of the subject permit so as to increase present production rates, allowing for appropriate emissions limits. The increase in emission limits will be offset by permanently shutting down other existing units.

We will be calling you in the near future to arrange a meeting to discuss the subject application.

Very truly yours,

E. O. Morris
Manager
Environment & Development

EOM:rw
Enclosures
cc: Mr. Jerry Campbell, HCEPC
(with Check for $365)
Mr. R. Nettles)
Mr. Steve Pinney) less Encls
Mr. R. J. Cabina)
Bill Thomas SW Dist. 6-2-87 RAM

DER
DER JUN 1 1987
MAY 29 1987 BAQM
BAQM

RECEIVED
DER - MAIL ROOM
1987 JUN -1 AM 11: 46

GARDINIER, INC. TAMPA, FLORIDA

NO. 44611 9705
17-1
910

DATE MO.	DAY	YR.
5/26		87

PAY EXACTLY ******1,000 DOLLARS AND 00 CENTS

DOLLARS	CENTS
$*****1,000	00

TO THE ORDER OF
FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION
7601 HIGHWAY 301 N
TAMPA FL 33610

GARDINIER, INC.

Gary I. Hampel
AUTHORIZED SIGNATURE

NORWEST BANK, N.A.
MINNEAPOLIS, MINNESOTA

⑈44611 9705⑈ ⑆091000019⑆ 07 81 900⑈

GARDINIER, INC. TAMPA, FLORIDA

NO. 44611 9730
17-1
910

DATE MO.	DAY	YR.
5/26		87

PAY EXACTLY ********365 DOLLARS AND 00 CENTS

DOLLARS	CENTS
$*******365	00

TO THE ORDER OF
HILLSBOROUGH COUNTY ENVIRON-
MENTAL PROTECTION COMMISSION
1900 9TH AVENUE
TAMPA FL 33605

GARDINIER, INC.

Gary I. Hampel
AUTHORIZED SIGNATURE

NORWEST BANK, N.A.
MINNEAPOLIS, MINNESOTA

⑈44611 9730⑈ ⑆091000019⑆ 07 81 900⑈

DER

JUN 1 1987

BAQM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

No. 76164

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Gardinier, Inc Date June 2, 1987

Address P.O. Box 3269, Tampa, FL, 33601 Dollars $ 1000.00

Applicant Name & Address Same As Above

Source of Revenue ✓ # 446119705

Revenue Code 001031 Application Number AC 29-135083

By R Bruce Mitchell

APPLICATION TO CONSTRUCT

NO. 5 DIAMMONIUM PHOSPHATE PLANT
PRODUCTION RATE INCREASE

Gardinier, Inc.
Tampa, Florida

May 1987

KBN Engineering and Applied Sciences, Inc.
P.O. Box 14288
Gainesville, Florida 32604
(904) 375-8000

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

AC 29-135083

DER

MAY 29 1987

BAQM

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Ammonium Phosphate Plant [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Gardinier, Inc. COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) No. 5 Ammonium Phosphate Plant

SOURCE LOCATION: Street U.S. 41 South & Riverview Drive City South of Tampa

UTM: East 362.9 North 3082.5

Latitude 27 ° 51 ' 28 "N Longitude 82 ° 23 ' 15 "W

APPLICANT NAME AND TITLE: Rudy J. Cabina, Vice President

APPLICANT ADDRESS: P.O. Box 3269, Tampa, Florida 33601

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Gardinier, Inc.

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Rudy J Cabina

Rudy J. Cabina, Vice President
Name and Title (Please Type)

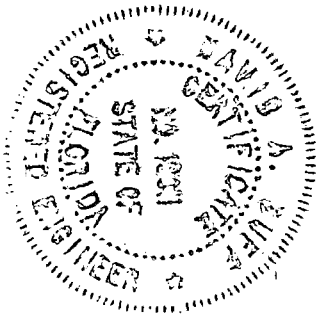
Date: 5/26/87 Telephone No. (813) 677-9111

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.



Signed David a. Buff

David A. Buff
Name (Please Type)

KBN Engineering and Applied Sciences, Inc.
Company Name (Please Type)

P.O. Box 14288, Gainesville, Florida 32604
Mailing Address (Please Type)

Florida Registration No. 19011 Date: May 12, 1987 Telephone No. (904) 375-8000

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

See Attachment A for complete description

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction see Attachment A Completion of Construction see Attachment A

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Not Applicable - all control equipment is currently in place

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Permit No.	AC 29-27760	AO 29-56011*
Issued	5-6-80	10-29-82
Expired	11-1-82	10-15-87

* Modified on 7-28-86

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr_____; if seasonal, describe:_____

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes

   a. If yes, has "offset" been applied? Yes

   b. If yes, has "Lowest Achievable Emission Rate" been applied? No

   c. If yes, list non-attainment pollutants. Particulate Matter, Ozone

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

G. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? Yes

   a. If yes, for what pollutants? Particulate Matter

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Phos Acid 100% + solids	Particulate	100	174,647	
	Fluoride	1.8		
Anhydrous Ammonia	-	-	52,776	

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 227,423 (dry basis)

2. Product Weight (lbs/hr): 240,000 (wet basis); 226,423 (dry basis)

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
Particulate	20.0	87.6	see Attachment A		20.0	87.6	
Fluoride	3.31	14.50	0.06 lb/ton	3.31	3.31	14.50	
Sulfur Dioxide	31.83	139.4	N/A	N/A	31.83	139.4	
Nitrogen Oxides	4.46	19.5	N/A	N/A	4.46	19.5	
Carbon Monoxide	0.41	1.80	N/A	N/A	0.41	1.80	
Volatile Org Cmpd	0.033	0.14	N/A	N/A	0.033	0.14	

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard.

[4] Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Packed Body, Up-flow	Particulate	98%	Submicron	Design
scrubbers (two in	Fluoride	95%	N/A	Design
parallel) - Mfg.				
by D.M. Weatherly				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 5 Fuel Oil	-	81.1 gal/hr	12.0
Natural gas	-	11,707 scf/hr	12.0

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: Natural gas/fuel oil

Percent Sulfur: Nil / 2.5% (max) Percent Ash: N/A / 0.1

Density: N/A / 8.0 lbs/gal Typical Percent Nitrogen: <1 / 0.2-0.9

Heat Capacity: 1025 Btu/scf / 18,500 BTU/lb N/A / 148,000 BTU/gal

Other Fuel Contaminants (which may cause air pollution):

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average N/A Maximum

G. Indicate liquid or solid wastes generated and method of disposal.

There are no solid wastes. Scrubber water is recycled to a plant-wide water recycle system.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 132.5 ft. Stack Diameter: 7.0 ft.

Gas Flow Rate: 116,500 ACFM 99,300 DSCFM Gas Exit Temperature: 108 °F.

Water Vapor Content: 8 % Velocity: 50.5 FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
   See Attachment B
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
   See Attachment B
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
   See Attachments B and D
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
   * Information already on file at FDER
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
   * Information already on file at FDER
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. No change from original permit application for No. 5 DAP
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
   Attached
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.
   Attached

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

Not Applicable

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[2]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

Not Applicable

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^{2}* _____ Wind spd/dir

Period of Monitoring _____/____/____ to _____/____/____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	_____ grams/sec
SO^2	_____ grams/sec

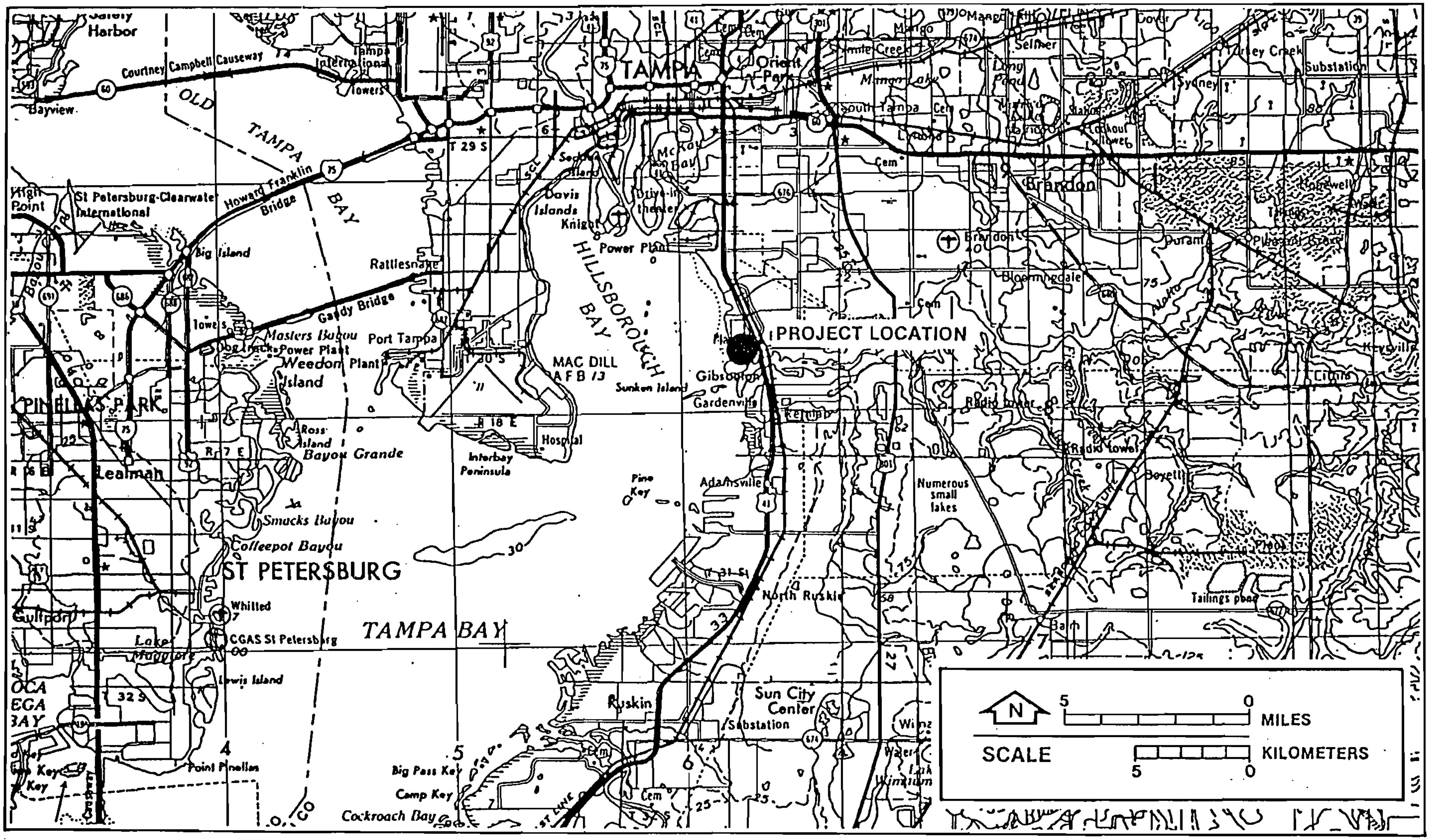
E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions and normal operating time.

F. Attach all other information supportive to the PSD review.

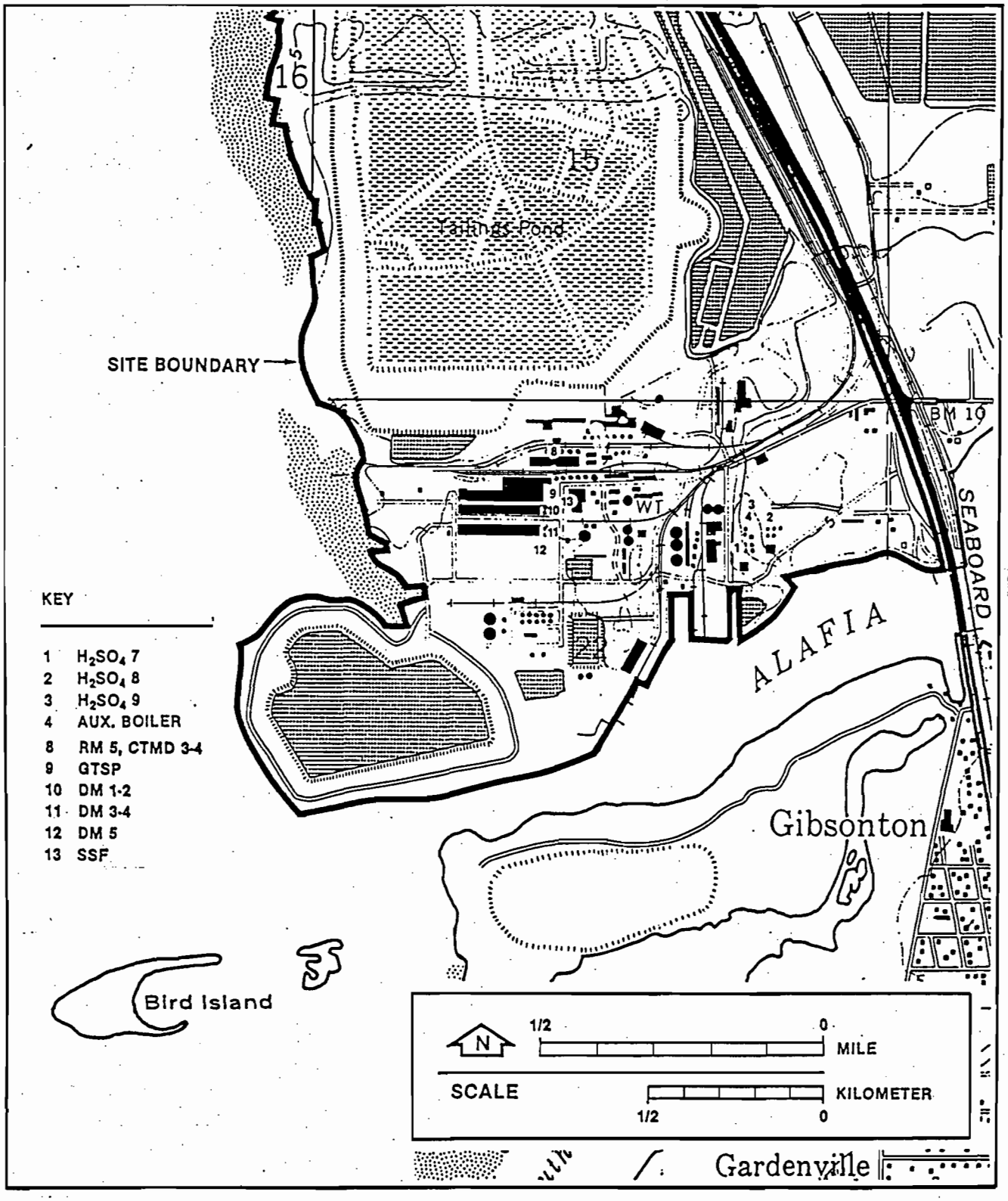
G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.



GENERAL LOCATION MAP OF GARDINIER, INC.

SOURCE: USGS, 1972.



SITE LOCATION MAP OF GARDINIER, INC.

SOURCE: USGS, 1981.

KBN

ATTACHMENT A

PROJECT DESCRIPTION

ATTACHMENT A

PROJECT DESCRIPTION

1.0 OVERVIEW

The proposed project involves the increase in production capacity of the No. 5 Diammonium Phosphate (DAP) plant located at the Gardinier, Inc., phosphate processing plant in Tampa, Florida. The No. 5 DAP plant was initially permitted for construction by the Florida Department of Environmental Regulation (FDER) in 1980 (Permit No. AC29-27760). The U.S. Environmental Protection Agency (USEPA) also issued Gardinier a Prevention of Significant Deterioration (PSD) permit in 1980 (PSD-FL-026), which granted approval for an increase in P_2O_5 production capacity of the Gardinier plant from 600,000 tons per year (TPY) to 720,000 TPY, as well as construction of the new No. 5 DAP plant. The No. 5 DAP plant was constructed and was issued an operating permit by FDER in 1982. This operating permit is currently in effect; expiration date is October 15, 1987.

The current operating permit for the No. 5 DAP plant does not restrict production capacity of the plant, as long as allowable emissions are not exceeded. Allowable emission rates for the No. 5 DAP plant are as follows:

* Fluorides - 0.06 lb/ton P_2O_5 and 1.4 lb/hr (6.1 TPY)
* Particulate matter - 0.43 lb/ton P_2O_5 and 10 lb/hr (43.8 TPY)
* Sulfur dioxide - 0.43 lb/ton P_2O_5 and 10 lb/hr (43.8 TPY)

The No. 5 DAP plant was originally designed as a 50 ton per hour (TPH) unit (23 TPH P_2O_5). However, Gardinier has been able to achieve considerably higher production rates from the plant, while remaining within the allowable emission levels. Gardinier now wishes to increase the production capacity of the plant to 120 TPH (55.2 TPH P_2O_5), but cannot guarantee that the current allowables will be met on a continuous basis. Therefore, Gardinier is also requesting an increase in the allowable emissions for the plant. The requested allowable emissions for the No. 5 DAP plant are as follows:

* Fluorides - 0.06 lb/ton P_2O_5 and 3.31 lb/hr (14.5 TPY)
* Sulfur dioxide - 31.8 lb/hr (139.4 TPY)
* Particulate matter - 20 lb/hr (87.6 TPY)

The proposed project also involves the shutdown of several existing sources at the Gardinier plant in Tampa, Florida. The sources to be shutdown consist of the No. 3 Triple Superphosphate and No. 4 Triple Superphosphate manufacturing lines and the Run-of-pile/Triple Superphosphate (ROP/TSP) sizing unit. These sources and current operating permit numbers are shown below along with the source's approximate shutdown date:

* No. 3 Triple Superphosphate Reactor Belt (Permit No. AO29-73831)	August 1987
* No. 3 Triple Superphosphate Dryer Scrubber (Permit No. AO29-73832)	August 1987
* No. 4 Triple Superphosphate Reactor Belt (Permit No. AO29-74083)	August 1987
* No. 4 Triple Superphosphate Dryer Scrubber (Permit No. AO29-74082)	August 1987
* ROP/TSP Sizing Unit Scrubber (Permit No. AO29-69648)	October 1987

Each of these sources has operated for the last ten years and has current operating permits. These shutdowns will create emission reductions of fluorides (FL), particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC).

Gardinier is located in Hillsborough County, Florida. Hillsborough County is designated as attainment or unclassifiable for all pollutants except particulate matter (PM) and ozone. In the case of ozone, the pollutant regulated is volatile organic compounds (VOC). Hillsborough County is designated as nonattainment for ozone, while only a portion of the county is nonattainment for PM. Gardinier is located in the nonattainment area for both PM and VOC, and is therefore subject to the state of Florida nonattainment rules for these pollutants.

The proposed project is discussed in greater detail below, on a pollutant specific basis. Supportive information is included in the attachments.

2.0 FLUORIDES

The Gardinier facility is currently operating under a FL allocation of 24.7 lb/hr for the entire phosphate complex. This allowable FL emission rate is based upon the state of Florida emission limitations contained in Florida Administrative Code (FAC), Chapter 17-2.600(3). The allocation was revised by FDER on November 29, 1984, and again on October 9, 1985 (see Attachment D for documentation). The current allocation of allowable FL emissions from the Gardinier facility is shown in Table 2-1. These allocated emissions are contained in specific conditions of the operating permits associated with each source.

It is proposed to reallocate the allowable FL emissions for the facility, based upon the requested higher FL emissions from the No. 5 DAP plant and the five sources to be shutdown. The proposed reallocation is shown in Table 2-1.

The sources to be shutdown currently are allocated a total of 8.5 lb/hr FL. The current allocated FL emission rate from the No. 5 DAP plant is 1.4 lb/hr, and it is requested to increase this allocation to 3.31 lb/hr. This new allocation is based upon the increased production rate of 55.2 TPH P_2O_5 and the New Source Performance Standard (NSPS) applicable to the source of 0.06 lb/ton P_2O_5 (refer to Attachment B for supportive information). This proposed emission rate represents an increase of 1.91 lb/hr from the No. 5 DAP plant. The remaining unallocated 6.59 lb/hr FL is proposed to be reallocated to the three existing Triple Superphosphate storage buildings.

As shown in Table 2-1, the total allowable FL emissions from the Gardinier facility (24.7 lb/hr) will not increase as a result of this re-allocation. It is noted that the proposed source shutdowns and change in the No. 5 DAP plant capacity will not affect the total P_2O_5 production capacity of the facility; it will remain at 720,000 TPY P_2O_5.

Table 2-1. Current and Proposed Allocation of Fluoride Emissions at Gardinier

Source	Permit No.	Current Limit (lb/hr)	Proposed Limit (lb/hr)	NSPS Limit (lb/hr)
No. 4 Phosphoric Acid	AO29-67643	1.2	1.2	1.2
No. 5 Ammonium Phosphate	AO29-56011	1.4	3.31	3.31 *
No. 3 Phosphoric Acid	AO29-81989	0.93	0.93	0.93
No. 3 Triple Superphosphate Reactor Belt	AO29-73831	2.0	-	-
No. 3 Triple Superphosphate Dryer Scrubber	AO29-73832	2.0	-	-
No. 4 Triple Superphosphate Reactor Belt	AO29-74083	2.0	-	-
No. 4 Triple Superphosphate Dryer Scrubber	AO29-74082	2.0	-	-
ROP/TSP Sizing Unit Scrubber	AO29-69648	0.5	-	-
Granular Triple Super Phos.	AO29-34585	3.45	3.45	-
No. 1 Diammonium Phosphate	AO29-70443	0.5	0.5	-
No. 2 Diammonium Phosphate	AO29-70444	0.5	0.5	-
No. 3 Diammonium Phosphate	AO29-73828	0.5	0.5	-
No. 4 Diammonium Phosphate	AO29-73927	0.5	0.5	-
Diammonium Cooler- North	AO29-70445	0.5	0.5	-
Diammonium Cooler- South	AO29-73830	0.5	0.5	-
Sodium Silicofluoride Plant	AO29-78962	0.5	0.5	-
Triple Superphosphate Storage Buildings (3)	-	5.72	12.31	-
	TOTALS	24.70	24.70	

* At proposed maximum production rate

Stack parameters for the sources to be shutdown, for the No. 5 DAP plant, and for the Triple Superphosphate storage buildings are shown in Table 2-2. Review of this table shows that the FL emissions reallocated to the No. 5 DAP plant will be emitted at a much greater height compared to the current emissions from the sources to be shutdown. The emissions reallocated to the storage buildings will be emitted at a height similar to the present emissions. Thus, there should be no increase in ground-level impacts of FL due to the proposed modification.

3.0 PARTICULATE MATTER

The No. 5 DAP plant currently has an allowable PM emission rate of 10 lb/hr. This emission limit was requested by Gardinier in the original permit application for the plant, and does not represent a Best Available Control Technology (BACT) determination. A revised allowable PM emission rate of 20 lb/hr is requested to accommodate the increased No. 5 DAP production rate, with an adequate margin of safety. This represents an increase in allowable PM emissions of 10 lb/hr. The revised allowable emissions represent a unit emission rate of 0.36 lb/ton P_2O_5 input at the maximum production rate. This is lower than the current allowable of 0.43 lb/ton P_2O_5 input (from USEPA PSD permit).

Gardinier is located in the Tampa total suspended particulate (TSP) nonattainment area. As a result, PM emissions from the sources proposed to be shutdown are limited by Reasonably Available Control Technology (RACT) regulations (FAC Chapter 17-2.650 (2)(c)5.). The RACT limits are the emission rates relied upon by FDER in demonstrating attainment for the nonattainment area, and have been incorporated into Florida's State Implementation Plan (SIP). The allowable RACT limits are shown in Table 3-1 (see Attachment D for copy of RACT rule). These allowable limits are reflected in specific conditions of the operating permits for each source. PM emissions allowed under RACT for the sources to be shutdown total 31.5 lb/hr.

Table 2-2. Stack Parameters For Sources Affected Under Proposed Modification

Source	Stack Height (ft)	Stack Diameter (ft)	Flow Rate (acfm)	Exit Gas Velocity (ft/sec)	Exit Gas Temperature (Deg. F)
No. 3 Triple Superphosphate Reactor Belt	65.0	4.00	35,000	46.4	90
No. 3 Triple Superphosphate Dryer Scrubber	68.0	3.50	25,600	44.3	117
No. 4 Triple Superphosphate Reactor Belt	65.0	4.00	28,500	37.8	80
No. 4 Triple Superphosphate Dryer Scrubber	68.0	3.50	25,000	43.3	90
ROP/TSP Sizing Unit Scrubber	74.0	4.00	21,000	27.9	93
Triple Superphosphate Storage Buildings (3)	60-85	*	*	*	*
No. 5 Diammonium Phosphate Plant	132.5	7.00	116,500	50.5	108

Source: Gardinier, 1987

* Emissions are released through roof vents of buildings

Table 3-1. Allowable Particulate Matter Emissions for Sources to be Shutdown*

Source	Allowed Emissions (lb/hr)	Allowed Emissions (tons/yr)	Basis
No. 3 Triple Superphosphate Reactor Belt	5.25	23.00	Permit No. AO29-73831 / RACT
No. 3 Triple Superphosphate Dryer Scrubber	8.25	36.14	Permit No. AO29-73832 / RACT
No. 4 Triple Superphosphate Reactor Belt	5.25	23.00	Permit No. AO29-74083 / RACT
No. 4 Triple Superphosphate Dryer Scrubber	8.25	36.14	Permit No. AO29-74082 / RACT
ROP/TSP Sizing Unit Scrubber	4.50	19.71	Permit No. AO29-69648 / RACT
TOTALS	31.50	137.97	

* Based upon RACT limits

Comparison of the requested increased PM emissions from the No. 5 DAP plant and the reduction in allowable emissions from the sources to be shutdown show a net decrease of 21.5 lb/hr. It is requested by Gardinier that these emissions be banked for future use by Gardinier. The net decrease in PM emissions will cause a net improvement in air quality within the TSP nonattainment area. As shown in Table 2-2, the No. 5 DAP plant has a stack height much greater than any of the five sources to be shutdown. Thus, a further net reduction in TSP air quality will occur as a result of the proposed modification. Upon approval of the creditable emission reductions by FDER, Gardinier will submit a modeling analysis which quantifies the net reduction in TSP air quality levels due to the proposed modification. This information will be supplied to determine the magnitude of impacts which will be banked, but is not considered to be a completeness item for permit application review purposes.

4.0 SULFUR DIOXIDE

Gardinier is also requesting that the allowable SO_2 emissions from the No. 5 DAP plant be increased from the current 10 lb/hr (43.8 TPY) to a new maximum of 31.83 lb/hr (139.4 TPY). The current 10 lb/hr emission limit was requested by Gardinier as part of the original permitting of the No. 5 DAP plant. It is not a BACT limit. As in the case of PM emissions, the higher emission rate will provide assurance of compliance at the higher production rate for the plant. The higher rate represents a 21.83 lb/hr (95.6 TPY) increase in allowable SO_2 emissions. The higher emission limit is equivalent to a unit emission rate of 0.58 lb/ton P_2O_5 input.

SO_2 is emitted from two of the sources which are proposed to be shutdown- the No. 3 and No. 4 Triple Superphosphate Dryers. These two dryers burn fuel oil and natural gas to supply the heat necessary for drying. Maximum SO_2 emissions from these sources have been documented in Gardinier's two previous requests for expansion of sulfuric acid production capacity (1984 and 1987 applications). Maximum SO_2 emissions were shown as 38.4 lb/hr from each dryer. These emission rates were used in the SO_2 impact analysis

conducted for these applications in order to demonstrate compliance with ambient air quality standards (AAQS).

Based upon the requested higher SO_2 emission rate from the No. 5 DAP plant and the proposed source shutdowns, there will result a net decrease of 55.0 lb/hr in allowable SO_2 emissions (two dryers @ 38.4 lb/hr each, or 76.8 lb/hr total, versus an increase of 21.8 lb/hr from No. 5 DAP plant). As shown in Table 2-2, the stack height of the No. 5 DAP plant is approximately twice the height of the two Triple Superphosphate Dryer scrubber stacks. As a result, there will be a net decrease in SO_2 impacts due to the proposed modification (i.e., decreasing emissions from lower stacks while increasing emissions from a higher stack).

5.0 NITROGEN OXIDES, CARBON MONOXIDE, AND VOLATILE ORGANIC COMPOUNDS

Currently, the No. 5 DAP plant does not have specific permit limits for NO_x, CO and VOC. The USEPA PSD permit Final Determination contained a figure of 28.5 TPY of NO_x from the plant. No conditions were placed upon NO_x in the PSD permit, and CO and VOC were not addressed. The operating permit application for the No. 5 DAP plant (submitted in May, 1982) similarly did not estimate emissions of NO_x, CO or VOC from the source. However, the maximum heat input to the process was stated to be 24.9×10^6 Btu/hr in this application. Based upon operational data from the No. 5 DAP plant, the maximum heat input to the process is now estimated as 12.0×10^6 Btu/hr. This significant reduction in fuel consumption will result in decreased maximum emissions of these pollutants. Emissions of these pollutants from the No. 5 DAP plant at the requested higher production rate are shown in Table 5-1.

NO_x, CO and VOC are also emitted from the No. 3 and No. 4 Triple Superphosphate dryers as a result of fuel burning. There are no allowable emission limits associated with these pollutants. Maximum emission rates for these pollutants for the two dryers are shown in Table 5-1, and were based upon AP-42 emission factors and fuel usage rates. The dryers can burn

Table 5-1. NOx, VOC and CO Emissions From Sources Affected Under Proposed Modification

Source	Nitrogen Oxides		Carbon Monoxide		Volatile Org. Cmpds.	
	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
No. 5 Diammonium Phosphate Plant @ 120 TPH	4.46	19.5	0.41	1.81	0.033	0.14
No. 3 and No. 4 Triple Superphosphate Dryer Scrubbers*	10.20	44.6	0.92	4.02	0.074	0.32

* Total for both dryers

either natural gas or fuel oil, and the maximum emission rates reflect the worst case fuel. Supportive calculations are presented in Attachment C.

Comparison of the emissions from the sources to be shutdown with the emissions from the No. 5 DAP plant show that the offsetting emissions are greater than the total emissions from the No. 5 DAP plant operating at the higher production rate, and would therefore more than offset the increase in emissions from the No. 5 DAP plant. As discussed previously, the No. 5 DAP plant has a higher stack height than any of the sources to be shutdown. Thus, net air quality improvement will result from the proposed modification.

ATTACHMENT B

EMISSION ESTIMATES FOR NO. 5 DAP PLANT

ATTACHMENT B

EMISSION ESTIMATES FOR NO. 5 DAP PLANT

I. Process Data
Production rate = 120 TPH
P_2O_5 content = 46%
P_2O_5 production rate = 120 TPH x 0.46 = 55.2 TPH
Maximum operating hours = 8,760 hr/yr

II. Fuel Usage Data
Maximum heat input rate = 12.0 x 10^6 Btu/hr
Fuel oil @ 148,000 Btu/gal, 2.5% S max
12.0 x 10^6 Btu/hr / 148,000 Btu/gal = 81.1 gal/hr
Natural gas @ 1025 Btu/scf
12.0 x 10^6 Btu/hr / 1025 Btu/scf = 11,707 scf/hr

III. Emission Calculations
a. Fluorides
Emission limit = NSPS = 0.06 lb/ton P_2O_5 input
FL emissions = 55.2 TPH x 0.06 lb/ton = 3.31 lb/hr
3.31 lb/hr x 8,760 hr/yr / 2000 lb/ton = 14.50 TPY

b. Particulate Matter
Proposed emission limit = 20.0 lb/hr
20.0 lb/hr x 8,760 hr/yr / 2000 lb/ton = 87.6 TPY
Unit emission rate = 20.0 lb/hr / 55.2 ton/hr = 0.36 lb/ton P_2O_5 input

c. Sulfur Dioxide
Theoretical emissions from fuel oil burning, based upon AP-42 factors:
Factor = 157 S lb/1000 gal = 157 x 2.5 = 392.5 lb SO_2/1000 gal
Emissions = 81.1 gal/hr x 392.5 lb/1000 gal = 31.83 lb/hr
31.83 lb/hr x 8,760 hr/yr / 2000 lb/ton = 139.4 TPY
Unit emission rate = 31.83 lb/hr / 55.2 ton/hr = 0.58 lb/ton P_2O_5 input

d. Nitrogen Oxides
Fuel oil burning: AP-42 factor = 55 lb/1000 gal
81.1 gal/hr x 55 lb/1000 gal = 4.46 lb/hr

Natural gas burning: AP-42 factor = 140 lb/10^6 scf
11,707 scf/hr x 140 lb/10^6 scf = 1.64 lb/hr

Maximum annual emissions based upon worst case fuel:
4.46 lb/hr x 8,760 hr/yr / 2000 lb/ton = 19.5 TPY

e. Carbon Monoxide

Fuel oil burning: AP-42 factor = 5 lb/1000 gal
81.1 gal/hr x 5 lb/1000 gal = 0.41 lb/hr

Natural gas burning: AP-42 factor = 35 lb/10^6 scf
11,707 scf/hr x 35 lb/10^6 scf = 0.41 lb/hr

Annual emissions:
0.41 lb/hr x 8,760 hr/yr / 2000 lb/ton = 1.80 TPY

f. Volatile Organic Compounds

Fuel oil burning: AP-42 factor (non-methane) = 0.28 lb/1000 gal
81.1 gal/hr x 0.28 lb/1000 gal = 0.023 lb/hr

Natural gas burning: AP-42 factor (non-methane) = 2.8 lb/10^6 scf
11,707 scf/hr x 2.8 lb/10^6 scf = 0.033 lb/hr

Maximum annual emissions based upon worst case fuel:
0.033 lb/hr x 8,760 hr/yr / 2000 lb/ton = 0.14 TPY

ATTACHMENT C

EMISSIONS OF NO_X, CO AND VOC
FROM NO. 3 AND NO. 4 TRIPLE
SUPERPHOSPHATE DRYERS

ATTACHMENT C

EMISSION OF NO_x, CO AND VOC
FROM
NO. 3 AND NO. 4 TRIPLE SUPERPHOSPHATE DRYERS

I. Fuel Usage Data
Maximum heat input rate = 13.5 x 10^6 Btu/hr, each dryer
Fuel oil @ 148,000 Btu/gal, 2.5% S max
13.5 x 10^6 Btu/hr / 148,000 Btu/gal = 91.2 gal/hr, each dryer
Natural gas @ 1025 Btu/scf
13.5 x 10^6 Btu/hr / 1025 Btu/scf = 13,171 scf/hr, each dryer

II. Emission Calculations (each Dryer)
a. Nitrogen Oxides
Fuel oil burning: AP-42 factor = 55 lb/1000 gal
91.2 gal/hr x 55 lb/1000 gal = 5.1 lb/hr

Natural gas burning: AP-42 factor = 140 lb/10^6 scf
13,171 scf/hr x 140 lb/10^6 scf = 1.84 lb/hr

Maximum annual emissions based upon worst case fuel:
5.1 lb/hr x 8,760 hr/yr / 2000 lb/ton = 22.3 TPY

b. Carbon Monoxide
Fuel oil burning: AP-42 factor = 5 lb/1000 gal
91.2 gal/hr x 5 lb/1000 gal = 0.46 lb/hr

Natural gas burning: AP-42 factor = 35 lb/10^6 scf
13,171 scf/hr x 35 lb/10^6 scf = 0.46 lb/hr

Annual emissions:
0.46 lb/hr x 8,760 hr/yr / 2000 lb/ton = 2.01 TPY

c. Volatile Organic Compounds
Fuel oil burning: AP-42 factor (non-methane) = 0.28 lb/1000 gal
91.2 gal/hr x 0.28 lb/1000 gal = 0.026 lb/hr

Natural gas burning: AP-42 factor (non-methane) = 2.8 lb/10^6 scf
13,171 scf/hr x 2.8 lb/10^6 scf = 0.037 lb/hr

Maximum annual emissions based upon worst case fuel:
0.037 lb/hr x 8,760 hr/yr / 2000 lb/ton = 0.16 TPY

ATTACHMENT D

SUPPORTIVE INFORMATION

TO: FILES (SEE ALLOCATION SHEET)

FROM: BILL THOMAS

SUBJECT: ALLOWABLE FLUORIDE EMISSIONS AT GARDINIER'S FACILITY IN HILLSBOROUGH COUNTY UNDER SUBSECTION 17-2.600 (3) (b) FAC.

Attached are: (1) Gardinier production records for Oct., Nov., Dec., 1971; (2) Gardinier cover letter and calculations to establish phos. acid production and F allowance under subject rule; (3) Gardinier allocation of allowable F emissions (revised 11/29/84); (4) DER verification of Oct.- Dec. 1971 production.

Allowable F emissions for the facility is 24.7 lbs./hr. Each source shall comply with the allowance on the allocation sheet (revised 11/29/84). Allowable F emission for TSP storage buildings have been lumped into one number. At some future date, following building emission tests, the F emission allocation sheet will be revised and each building will be allocated a fluoride emission allowance.

WCT/js

cc: Jerry Campbell, HCEPC
Al Morrison, Gardinier

Gardinier Allocation of Allowable Fluoride Emissions - Revised 11/29/84

The allocation of 24.7 Lb/Hr is as follows:

Source	Permit No.	Limit Lb/Hr	Current Permit Limit	NSPS Limit
#4 PhosAcid	AO29-67643	1.2	1.2	1.2 (New Source)
#5 Di-Mon	AO29-56011	1.4	1.4	1.4 (New Source)
#3 PhosAcid	AO29-81989	0.93	0.93	0.93
#7 Concentrator	AO29-78257	0.8	1.2	-
#8 Concentrator	AO29-74836	0.8	1.2	-
#3 CTM Belt	AO29-73831	1.8	1.44	1.15
#3 CTM Dryer	AO29-73832	2.0	1.92	-
#4 CTM Belt	AO29-74083	1.8	1.44	1.15
#4 CTM Dryer	AO29-70082	2.0	1.92	-
Triple Supr Sizing	AO29-69648	0.5	0.48	-
GTSP Plant	AO29-34585	3.45	3.45	3.45
#1 Di-Mon	AO29-70443	0.5	0.36	)
#2 Di-Mon	AO29-70444	0.5	0.36	1.08) DM1,,DM2, DMCN
Di-Mon Cooler, No.	AO29-70445	0.5	0.36	)
#3 Di-Mon	AO29-73828	0.5	0.36	)
#4 Di-Mon	AO29-73927	0.5	0.36	1.08) DM3,DM4, DMCS
Di-Mon Cooler, So.	Ao29-73830	0.5	0.36	)
Mini-Mon	AO29-71657	0.4	0.40	-
Sodium SilicoFluor	AO29-78962	0.5	0.50	-
Uranium AcidPretreat	AO29-28414	0.05	0.01	-
Uranium Purification Building	AO29-28416	0.05	0.03	-
Triple Super Storage Buildings (3)		4.02		
	Total	24.70		

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHWEST DISTRICT
7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610

Gardinier Allocation of Allowable Fluoride Emissions
Revised 10/9/1985

Source	Permit No.	Limit Lbs./Hr.	NSPS Limit
#4 PhosAcid	A029-67643	1.2	1.2 (New Source)
#5 Di-Mon	A029-56011	1.4	1.4 (New Source)
#3 PhosAcid	A029-81989	0.93	0.93
#3 CTM Belt	A029-73831	2.0	-
#3 CTM Dryer	A029-73832	2.0	-
#4 CTM Belt	A029-74083	2.0	-
#4 CTM Dryer	A029-70082	2.0	-
Triple Supr. Sizing	A029-69648	0.5	-
GTSP Plant	A029-34585	3.45	-
#1 Di-Mon	A029-70443	0.5	-
#2 Di-Mon	A029-70444	0.5	-
#3 Di-Mon	A029-73828	0.5	-
#4 Di-Mon	A029-73927	0.5	-
Di-Mon Cooler, North	A029-70445	0.5	-
Di-Mon Cooler, South	A029-73830	0.5	-
Sodium SilicoFluor	A029-78962	0.5	-
Triple Super Storage Buildings (3)		5.72	-
	Total	24.70	

RACT Rule for Particulate Matter from Phosphate Processing Operations

b. Emission Limitations - No owner or operator of an asphalt concrete plant shall cause, permit, or allow the emission of particulate matter in excess of 0.06 gr/dscf, or visible emissions the density of which is greater than Number 1 on the Ringelmann Chart (20 percent opacity).

5. Phosphate Processing Operations.

a. Applicability - The emission limitations set forth in 17-2.650 (2)(c)5. shall apply to all unit operations and auxiliary equipment which are an integral part of the process used to manufacture the finished products specified in paragraphs (i) through (vi) below, including reactors, driers, coolers, concentrators, screens, elevators, conveyor belts, grinders, and other unit operations, which exist as part of the manufacturing system from the point of introduction of raw materials feed into the process to the point of discharge of the finished product to the storage materials handling system:

(i) Diammonium phosphate (DAP);

(ii) Run of pile triple super phosphate (ROPTSP);

(iii) Granular triple super phosphate (GTSP);

(iv) Normal super phosphate (NSP);

(v) Monoammonium phosphate (MAP); and

(vi) Phosphate animal feed ingredient (AFI).

b. Emission Limitations.

(i) No owner or operator of a phosphate processing facility shall cause, permit or allow total emissions of particulate matter from the affected unit operations and auxiliary equipment in excess of 0.30 pounds per ton of product or visible emissions the density of which is greater than Number 1 on the Ringelmann Chart (20 percent opacity) from the above listed operations ((i) through (vi)).

(ii) No owner or operator of a Phosphate rock drier or phosphate rock grinding operation which is not an integral part of the operations described in sections 5.a. (i) through (vi) shall cause, permit or allow total emissions of particulate matter from the drier or grinder in excess of 0.20 lb/ton of product or visible emissions the density of which is greater than Number 1 on the Ringelmann Chart (20 percent opacity).

(iii) No owner or operator of a concentrator which is part of a phosphate processing facility shall cause, permit or allow total emissions of particulate matter from the concentrator in excess of 15 pounds per hour or visible emissions the density of which is greater than Number 1 on the Ringelmann Chart (20 percent opacity).

(iv) No owner or operator of a Diammonium Phosphate cooler producing less than 50 tons per hour of product shall cause, permit, or allow total emissions of particulate matter in excess of 0.60 pounds per ton of product or visible emissions the density of which is greater than Number 1 on the Ringelmann Chart (20 percent opacity).

6. Glass Manufacturing Process.

a. Applicability - The emission limitations set forth in 17-2.650 (2)(c)6. shall apply to glass melting furnaces producing container glass.

b. Emission Limitations - No owner or operator of a glass melting furnace shall cause, permit, or allow emissions of particulate

Fluoride Emission Standards for Phosphate Processing

PART VI
EMISSION LIMITING AND PERFORMANCE STANDARDS

17-2.600 Specific Source Emission Limiting Standards.

No person shall cause, let, permit, suffer or allow to be discharged into the atmosphere emissions from the following sources greater than the emission limiting standards specified below. Where work practice standards, including requirements for specific types of pollution control equipment, are provided for in this section, such standards shall be of the same force and effect as emission limiting standards.

(1) Incinerators.

(a) Any incinerator with a charging rate of less than 50 tons per day.

1. No visible emissions (5 percent opacity) except that visible emissions with a density of Number 1 on the Ringelmann Chart (20 percent opacity) are allowed for up to three minutes in any one hour.

2. No objectionable odor allowed.

(b) Existing incinerators with a charging rate equal to or greater than 50 tons per day.

1. Particulate matter - 0.1 grains per standard cubic foot dry gas corrected to 50 percent excess air.

2. No objectionable odor allowed.

(c) New incinerators with a charging rate equal to or greater than 50 tons per day.

1. Particulate matter - 0.08 grains per standard cubic foot dry gas corrected to 50 percent excess air.

2. No objectionable odor allowed.

(2) Sulfuric Acid Plants.

(a) Existing Plants.

1. Florida portion of the Jacksonville, Florida - Brunswick, Georgia, Interstate Air Quality Control Region as defined in 40 CFR Section 81.91.

a. Visible Emissions - ten percent opacity.

b. Sulfur Dioxide - 29 pounds per ton of 100 percent acid produced.

c. Acid Mist - 0.5 pounds per ton of 100 percent acid produced.

2. All other areas of the State of Florida.

a. Visible Emissions - ten percent opacity, Number 1/2 on the Ringelmann Chart.

b. Sulfur Dioxide - 10 pounds per ton of 100 percent acid produced.

c. Acid Mist - 0.3 pounds per ton of 100 percent acid produced.

(b) New Plants.

1. Visible emissions - ten percent opacity, Number 1/2 on the Ringelmann Chart.

2. Sulfur Dioxide - four pounds per ton of 100 percent acid produced.

3. Acid Mist - 0.15 pounds per ton of 100 percent acid produced.

(3) Phosphate Processing. Fluorides (water soluble or gaseous atomic weight 19) expressed as pounds of fluoride per ton of phosphate materials input to the system expressed as tons of P_2O_5.

(a) New Plants or Plant Sections.

1. Wet process phosphoric acid production and auxiliary equipment - 0.02 pounds.

2. Run-of-Pile triple super phosphate (TSP) mixing belt and den and auxiliary equipment - 0.05 pounds.

3. Run-of-pile TSP curing or storage process and auxiliary equipment - 0.12 pounds.

4. Granular triple super phosphate (GTSP) production and auxiliary equipment.

a. GTSP made by granulating run-of-pile TSP - 0.06 pounds.

b. GTSP made from phosphoric acid and phosphate rock slurry - 0.15 pounds.

5. GTSP storage and auxiliary equipment - 0.05 pounds.

6. Diammonium phosphate production and auxiliary equipment - 0.06 pounds.

7. Calcining or other thermal phosphate rock processing and auxiliary equipment excepting phosphate rock drying and defluorinating - 0.05 pounds.

8. Defluorinating phosphate rock by thermal processing and auxiliary equipment - 0.37 pounds.

9. All plants, plant sections or unit operations and auxiliary equipment not listed in paragraphs 1. through 8. above must use the best available control technology as determined pursuant to Section 17-2.640.

(b) Existing plants or plant sections shall comply with Section 17-2.600(3)(a) no later than July 1, 1975; or existing plant complexes with an operating wet process phosphoric acid section (including any items in Section 17-2.600(3)(a)1. through 6.) and other plant sections processing or handling phosphoric acid or products of phosphoric acid processing, total emissions from the entire complex shall not exceed 0.4 pounds per ton of P_2O_5 input to the wet process phosphoric acid section.

(4) Kraft (Sulfate) Pulp Mills and Tall Oil Plants.

The provisions of this rule that apply to tall oil plants within Kraft (Sulfate) Pulp Mills also apply to tall oil plants that are located in a separate facility. In the case of separate tall oil plants, phrases such as "the owner or operator of a kraft pulp mill" shall be construed to read "the owner or operator of a tall oil plant."

(a) Visible Emissions (Reserved).

(b) Particulate Matter.

1. Kraft Recovery Furnaces - three pounds per each 3000 pounds of black liquor solids fed.

2. (Reserved).

(c) Total Reduced Sulfur (TRS).

1. Digester Systems, Multiple Effect Evaporator Systems, Condensate Stripper Systems.

a. Gaseous emissions shall be collected and incinerated in a lime kiln or calciner meeting the requirements of either Rule 17-2.600(4)(c)5., FAC, or Rule 17-2.660, FAC, or a kraft recovery furnace meeting the requirements of Rule 17-2.600(4)(c)3., FAC, or Rule 17-2.660, FAC, or a combustion device meeting the requirements of either Rule 17-2.600(4)(c)6., FAC, or Rule 17-2.660, FAC, or;

b. 5 ppm by volume on a dry basis at standard conditions corrected to the actual oxygen content of the untreated flue gas stream as a 12-hour average if a means other than incineration in a combustion device pursuant to Rule 17-2.600(4)(c)1.a., FAC, is used to control gaseous emissions of total reduced sulfur.

c. Total reduced sulfur emissions shall not be vented to the atmosphere at any point connected to or between the source and the

AP-42 Emission Factors

TABLE 1.3-1. UNCONTROLLED EMISSION FACTORS FOR FUEL OIL COMBUSTION

EMISSION FACTOR RATING: A

Boiler Type[a]	Particulate Matter[b]		Sulfur Dioxide[c]		Sulfur Trioxide		Carbon Monoxide[d]		Nitrogen Oxide[e]		Volatile Organics[f] Nonmethane		Methane	
	$kg/10^3$ l	$lb/10^3$ gal	$kg/10^3$ l	$lb/10^3$ gal	$kg/10^3$ l	$lb/10^3$ gal	$kg/10^3$ l	$lb/10^3$ gal	$kg/10^3$ l	$lb/10^3$ gal	$kg/10^3$ l	$lb/10^3$ gal	$kg/10^3$ l	$lb/10^3$ gal
Utility Boilers														
Residual Oil	g	g	19S	157S	0.34S[h]	2.9S[h]	0.6	5	8.0 (12.6)(5)[i]	67 (105)(42)[i]	0.09	0.76	0.03	0.28
Industrial Boilers														
Residual Oil	g	g	19S	157S	0.24S	2S	0.6	5	6.6[j]	55[j]	0.034	0.28	0.12	1.0
Distillate Oil	0.24	2	17S	142S	0.24S	2S	0.6	5	2.4	20	0.024	0.2	0.006	0.052
Commercial Boilers														
Residual Oil	g	g	19S	157S	0.24S	2S	0.6	5	6.6	55	0.14	1.13	0.057	0.475
Distillate Oil	0.24	2	17S	142S	0.24S	2S	0.6	5	2.4	20	0.04	0.34	0.026	0.216
Residential Furnaces														
Distillate Oil	0.3	2.5	17S	142S	0.24S	2S	0.6	5	2.2	18	0.085	0.713	0.214	1.78

[a] Boilers can be approximately classified according to their gross (higher) heat rate as shown below:
Utility (power plant) boilers: >106 x 10^9 J/hr (>100 x 10^6 Btu/hr)
Industrial boilers: 10.6 x 10^9 to 106 x 10^9 J/hr (10 x 10^6 to 100 x 10^6 Btu/hr)
Commercial boilers: 0.5 x 10^9 to 10.6 x 10^9 J/hr (0.5 x 10^6 to 10 x 10^6 Btu/hr)
Residential furnaces: <0.5 x 10^9 J/hr (<0.5 x 10^6 Btu/hr)

[b] References 3-7 and 24-25. Particulate matter is defined in this section as that material collected by EPA Method 5 (front half catch).

[c] References 1-5. S indicates that the weight % of sulfur in the oil should be multiplied by the value given.

[d] References 3-5 and 8-10. Carbon monoxide emissions may increase by factors of 10 to 100 if the unit is improperly operated or not well maintained.

[e] Expressed as NO_2. References 1-5, 8-11, 17 and 26. Test results indicate that at least 95% by weight of NO_x is NO for all boiler types except residential furnaces, where about 75% is NO.

[f] References 18-21. Volatile organic compound emissions are generally negligible unless boiler is improperly operated or not well maintained, in which case emissions may increase by several orders of magnitude.

[g] Particulate emission factors for residual oil combustion are, on average, a function of fuel oil grade and sulfur content:
Grade 6 oil: 1.25(S) + 0.38 kg/10^3 liter [10(S) + 3 lb/10^3 gal] where S is the weight % of sulfur in the oil. This relationship is based on 81 individual tests and has a correlation coefficient of 0.65.
Grade 5 oil: 1.25 kg/10^3 liter (10 lb/10^3 gal)
Grade 4 oil: 0.88 kg/10^3 liter (7 lb/10^3 gal)

[h] Reference 25.

[i] Use 5 kg/10^3 liters (42 lb/10^3 gal) for tangentially fired boilers, 12.6 kg/10^3 liters (105 lb/10^3gal) for vertical fired boilers, and 8.0 kg/10^3 liters (67 lb/10^3 gal) for all others, at full load and normal (>15%) excess air. Several combustion modifications can be employed for NO_x reduction: (1) limited excess air can reduce NO_x emissions 5-20%, (2) staged combustion 20-40%, (3) using low NO_x burners 20-50%, and (4) ammonia injection can reduce NO_x emissions 40-70% but may increase emissions of ammonia. Combinations of these modifications have been employed for further reductions in certain boilers. See Reference 23 for a discussion of these and other NO_x reducing techniques and their operational and environmental impacts.

[j] Nitrogen oxides emissions from residual oil combustion in industrial and commercial boilers are strongly related to fuel nitrogen content, estimated more accurately by the empirical relationship:
kg $NO_2/10^3$ liters = 2.75 + 50(N)^2 [lb $NO_2/10^3$gal = 22 + 400(N)^2] where N is the weight % of nitrogen in the oil. For residual oils having high (>0.5 weight %) nitrogen content, use 15 kg $NO_2/10^3$ liter (120 lb $NO_2/10^3$gal) as an emission factor.

TABLE 1.4-1. UNCONTROLLED EMISSION FACTORS FOR NATURAL GAS COMBUSTION[a]

Furnace Size & Type (10^6 Btu/hr heat input)	Particulates[b]		Sulfur Dioxide[c]		Nitrogen Oxide[d,e]		Carbon Monoxide[f,g]		Volatile Organics: Nonmethane		Volatile Organics: Methane	
	$kg/10^6m^3$	$lb/10^6ft^3$	$kg/10^6m^3$	$lb/10^6ft^3$	$kg/10^6m^3$	$lb/10^6ft^3$	$kg/10^6m^3$	$lb/10^6ft^3$	$kg/10^6m^3$	$lb/10^6ft^3$	$kg/10^6m^3$	$lb/10^6ft^3$
Utility boilers (>100)	16-80	1-5	9.6	0.6	8800[h]	550[h]	640	40	23	1.4	4.8	0.3
Industrial boilers (10 - 100)	16-80	1-5	9.6	0.6	2240	140	560	35	44	2.8	48	3
Domestic and commercial boilers (<10)	16-80	1-5	9.6	0.6	1600	100	320	20	84	5.3	43	2.7

[a] All emission factors are expressed as weight per volume fuel fired.
[b] References 15-18.
[c] Reference 4 (based on an average sulfur content of natural gas of 4600 $g/10^6$ Nm^3 (2000 $gr/10^6$ scf).
[d] References 4-5,7-8,11,14,18-19,21.
[e] Expressed as NO_2. Test results indicate that about 95 weight % of NO_x is NO.
[f] References 4,7-8,16,18,22-25.
[g] References 16 and 18. May increase 10 to 100 times with improper operation or maintenance.
[h] Use 4400 $kg/10^6$ m^3 (275 $lb/10^6ft^3$) for tangentially fired units. At reduced loads, multiply this factor by the load reduction coefficient given in Figure 1.4-1. See text for potential NO_x reductions by combustion modifications. Note that the NO_x reduction from these modifications will also occur at reduced load conditions.